



SEQUENCE LISTING

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Bartfeld, Daniel

<120> EFFICIENT METHODS FOR PRODUCING
ANTIMICROBIAL CATIONIC PEPTIDES IN HOST CELLS

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<223> Anionic spacer peptide		
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<213> Apis mellifera		
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<213> Apis mellifera

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1 5

<210> 31
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1 5

<210> 32
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<400> 32
Glu Ala Glu Leu Glu Ala Glu Pro
1 5

<210> 33
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<400> 33
Glu Pro Glu Ala Glu Pro
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<210> 34
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Glu Ala Glu Pro
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<220>
<223> Modified indolicidin cationic peptide

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<220>
 <223> Modified indolicidin cationic peptide

<400> 36

Ile Leu Arg Trp Pro Trp Trp Pro Trp Arg Arg Lys
 1 5 10

<210> 37
 <211> 34
 <212> PRT
 <213> Apis mellifera

<400> 37

Tyr Val Pro Leu Pro Asn Val Pro Gln Pro Gly Arg Arg Pro Phe Pro
 1 5 10 15
 Thr Phe Pro Gly Gln Gly Pro Phe Asn Pro Lys Ile Lys Trp Pro Gln
 20 25 30
 Gly Tyr

<210> 38
 <211> 34
 <212> PRT
 <213> Drosophila melanogaster

<400> 38

Val Phe Ile Asp Ile Leu Asp Lys Val Glu Asn Ala Ile His Asn Ala
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 Ala Gln Val Gly Ile Gly Phe Ala Lys Pro Phe Glu Lys Leu Ile Asn
 20 25 30
 Pro Lys

<210> 39
 <211> 18
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<400> 39

Gly Asn Asn Arg Pro Val Tyr Ile Pro Gln Pro Arg Pro Pro His Pro
 1 5 10 15
 Arg Ile

<210> 40
 <211> 18
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 <213> Apis mellifera

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 Gly Asn Asn Arg Pro Val Tyr Ile Pro Gln Pro Arg Pro Pro His Pro
 1 5 10 15
 Arg Leu

<210> 41
 <211> 18
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 <213> Apis mellifera

<400> 41
 Gly Asn Asn Arg Pro Ile Tyr Ile Pro Gln Pro Arg Pro Pro His Pro
 1 5 10 15
 Arg Leu

<210> 42
 <211> 12
 <212> PRT
 <213> Bos taurus

<400> 42
 Arg Leu Cys Arg Ile Val Val Ile Arg Val Cys Arg
 1 5 10

<210> 43
 <211> 42
 <212> PRT
 <213> Bos taurus

<400> 43
 Arg Phe Arg Pro Pro Ile Arg Arg Pro Pro Ile Arg Pro Pro Phe Tyr
 1 5 10 15
 Pro Pro Phe Arg Pro Pro Ile Arg Pro Pro Ile Phe Pro Pro Ile Arg
 20 25 30
 Pro Pro Phe Arg Pro Pro Leu Arg Phe Pro
 35 40

<210> 44
 <211> 59
 <212> PRT
 <213> Bos taurus

<400> 44
 Arg Arg Ile Arg Pro Arg Pro Pro Arg Leu Pro Arg Pro Arg Pro Arg
 1 5 10 15
 Pro Leu Pro Phe Pro Arg Pro Gly Pro Arg Pro Ile Pro Arg Pro Leu
 20 25 30
 Pro Phe Pro Arg Pro Gly Pro Arg Pro Ile Pro Arg Pro Leu Pro Phe
 35 40 45
 Pro Arg Pro Gly Pro Arg Pro Ile Pro Arg Pro
 50 55

<210> 45
<211> 37
<212> PRT
<213> Manduca sexta

<400> 45
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 Ala Val Ile Ser Ala Ala Pro Ala Val Ala Thr Val Gly Gln Ala Ala
 20 25 30
 Ala Ile Ala Arg Gly
 35

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<211> 37
<212> PRT
<213> Manduca sexta

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 1 5 10 15
 Ala Ile Ile Ser Ala Gly Pro Ala Val Ala Thr Val Gly Gln Ala Ala
 20 25 30
 Ala Ile Ala Arg Gly
 35

<210> 47
<211> 37
<212> PRT
<213> Manduca sexta

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 20 25 30
 Ala Ile Ala Arg Gly
 35

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<212> PRT
<213> *Manduca sexta*

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Ala Val Ile Ser Ala Ala Ala Val Ala Thr Val Gly Gln Ala Ala Ala
20 25 30
Ile Ala Arg Gly Gly
35

<210> 49
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<212> PRT
<213> *Bombina variegata*

<400> 49
Gly Ile Gly Ala Leu Ser Ala Lys Gly Ala Leu Lys Gly Leu Ala Lys
1 5 10 15
Gly Leu Ala Glx His Phe Ala Asn
20

<210> 50
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<212> PRT
<213> *Bombina orientalis*

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Gly Ile Gly Ala Ser Ile Leu Ser Ala Gly Lys Ser Ala Leu Lys Gly
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Leu Ala Lys Gly Leu Ala Glu His Phe Ala Asn
20 25

<210> 51
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<212> PRT
<213> *Bombina orientalis*

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Gly Ile Gly Ser Ala Ile Leu Ser Ala Gly Lys Ser Ala Leu Lys Gly
1 5 10 15
Leu Ala Lys Gly Leu Ala Glu His Phe Ala Asn
20 25

<210> 52
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<212> PRT
<213> *Megabombus pennsylvanicus*

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1
Val

5

10

15

<210> 53
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<212> PRT
<213> Megabombus pennsylvanicus

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1 5 10 15
Val

<210> 54
<211> 58
<212> PRT
<213> Bos taurus

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1 5 10 15
Arg Ile Ile Arg Tyr Phe Tyr Asn Ala Lys Ala Gly Leu Cys Gln Thr
20 25 30
Phe Val Tyr Gly Gly Cys Arg Ala Lys Arg Asn Asn Phe Lys Ser Ala
35 40 45
Glu Asp Cys Met Arg Thr Cys Gly Gly Ala
50 55

<210> 55
<211> 24
<212> PRT
<213> Rana esculenta

<400> 55
Phe Leu Pro Leu Leu Ala Gly Leu Ala Ala Asn Phe Leu Pro Lys Ile
1 5 10 15
Phe Cys Lys Ile Thr Arg Lys Cys
20

<210> 56
<211> 33
<212> PRT
<213> Rana esculenta

<400> 56
Gly Ile Met Asp Thr Leu Lys Asn Leu Ala Lys Thr Ala Gly Lys Gly
1 5 10 15
Ala Leu Gln Ser Leu Leu Asn Lys Ala Ser Cys Lys Leu Ser Gly Gln
20 25 30

Cys

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<210> 57
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<212> PRT
<213> Hyalophora cecropia

<400> 57
Lys Trp Lys Leu Phe Lys Lys Ile Glu Lys Val Gly Gln Asn Ile Arg
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Asp Gly Ile Ile Lys Ala Gly Pro Ala Val Ala Val Val Gly Gln Ala
20 25 30
Thr Gln Ile Ala Lys
35

<210> 58
<211> 35
<212> PRT
<213> Hyalophora cecropia

<400> 58
Lys Trp Lys Val Phe Lys Lys Ile Glu Lys Met Gly Arg Asn Ile Arg
1 5 10 15
Asn Gly Ile Val Lys Ala Gly Pro Ala Ile Ala Val Leu Gly Glu Ala
20 25 30
Lys Ala Leu
35

<210> 59
<211> 40
<212> PRT
<213> Drosophila melanogaster

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Thr Arg Asp Ala Thr Ile Gln Gly Leu Gly Ile Ala Gln Gln Ala Ala
20 25 30
Asn Val Ala Ala Thr Ala Arg Gly
35 40

<210> 60
<211> 36
<212> PRT
<213> Hyalophora cecropia

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1 5 10 15
Ala Val Ile Ser Ala Gly Pro Ala Val Ala Thr Val Ala Gln Ala Thr

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Ala Leu Ala Lys		
35		
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<213> Sus scrofa		
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<213> Leiurus quin-questriatus hebraeus		
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Cys Cys Arg		
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<211> 35
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 <213> Mus musculus

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 Glu Arg Met Asn Gly Thr Cys Arg Lys Gly His Leu Met Tyr Thr Leu
 20 25 30
 Cys Cys Arg
 35

<210> 66
 <211> 33
 <212> PRT
 <213> Oryctolagus cuniculus

<400> 66
 Val Val Cys Ala Cys Arg Arg Ala Leu Cys Leu Pro Arg Glu Arg Arg
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 Ala Gly Phe Cys Arg Ile Arg Gly Arg Ile His Pro Leu Cys Cys Arg
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 Arg

<210> 67
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 <212> PRT
 <213> Oryctolagus cuniculus

<400> 67
 Val Val Cys Ala Cys Arg Arg Ala Leu Cys Leu Pro Leu Glu Arg Arg
 1 5 10 15
 Ala Gly Phe Cys Arg Ile Arg Gly Arg Ile His Pro Leu Cys Cys Arg
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 Arg

<210> 68
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 <212> PRT
 <213> Cavia cutteri

<400> 68
 Arg Arg Cys Ile Cys Thr Thr Arg Thr Cys Arg Phe Pro Tyr Arg Arg
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 Leu Gly Thr Cys Ile Phe Gln Asn Arg Val Tyr Thr Phe Cys Cys
 20 25 30

<210> 69
 <211> 31

<212> PRT
 <213> Cavia cutteri

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 Leu Gly Thr Cys Leu Phe Gln Asn Arg Val Tyr Thr Phe Cys Cys
 20 25 30

<210> 70
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 <212> PRT
 <213> Homo Sapien

<400> 70
 Ala Cys Tyr Cys Arg Ile Pro Ala Cys Ile Ala Gly Glu Arg Arg Tyr
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 Gly Thr Cys Ile Tyr Gln Gly Arg Leu Trp Ala Phe Cys Cys
 20 25 30

<210> 71
 <211> 29
 <212> PRT
 <213> Homo Sapien

<400> 71
 Cys Tyr Cys Arg Ile Pro Ala Cys Ile Ala Gly Glu Arg Arg Tyr Gly
 1 5 10 15
 Thr Cys Ile Tyr Gln Gly Arg Leu Trp Ala Phe Cys Cys
 20 25

<210> 72
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 <213> Oryctolagus cuniculus

<400> 72
 Val Val Cys Ala Cys Arg Arg Ala Leu Cys Leu Pro Arg Glu Arg Arg
 1 5 10 15
 Ala Gly Phe Cys Arg Ile Arg Gly Arg Ile His Pro Leu Cys Cys Arg
 20 25 30

Arg

<210> 73
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 <213> Oryctolagus cuniculus

<400> 73
 Val Val Cys Ala Cys Arg Arg Ala Leu Cys Leu Pro Leu Glu Arg Arg

<210> 74
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<212> PRT
<213> *Rattus norvegicus*

<210> 75
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<212> PRT
<213> *Rattus norvegicus*

<210> 76
<211> 38
<212> PRT
<213> Bos taurus

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<400> 76
Asp Phe Ala Ser Cys His Thr Asn Gly Gly Ile Cys Leu Pro Asn Arg
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Cys Pro Gly His Met Ile Gln Ile Gly Ile Cys Phe Arg Pro Arg Val
      20          25          30
Lys Cys Cys Arg Ser Trp
      35

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<210> 77
<211> 40
<212> PRT
<213> Bos taurus

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<400> 77
Val Arg Asn His Val Thr Cys Arg Ile Asn Arg Gly Phe Cys Val Pro
   1           5           10          15
Ile Arg Cys Pro Gly Arg Thr Arg Gln Ile Gly Thr Cys Phe Gly Pro
   20          25          30

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Arg Ile Lys Cys Cys Arg Ser Trp
 35 40

 <210> 78
 <211> 38
 <212> PRT
 <213> Bos taurus

 <400> 78
 Asn Pro Val Ser Cys Val Arg Asn Lys Gly Ile Cys Val Pro Ile Arg
 1 5 10 15
 Cys Pro Gly Ser Met Lys Gln Ile Gly Thr Cys Val Gly Arg Ala Val
 20 25 30
 Lys Cys Cys Arg Lys Lys
 35

 <210> 79
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 <212> PRT
 <213> Sacrophaga peregrina

 <400> 79
 Ala Thr Cys Asp Leu Leu Ser Gly Thr Gly Ile Asn His Ser Ala Cys
 1 5 10 15
 Ala Ala His Cys Leu Leu Arg Gly Asn Arg Gly Gly Tyr Cys Asn Gly
 20 25 30
 Lys Ala Val Cys Val Cys Arg Asn
 35 40

 <210> 80
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 <212> PRT
 <213> Aeschna cyanea

 <400> 80
 Gly Phe Gly Cys Pro Leu Asp Gln Met Gln Cys His Arg His Cys Gln
 1 5 10 15
 Thr Ile Thr Gly Arg Ser Gly Gly Tyr Cys Ser Gly Pro Leu Lys Leu
 20 25 30
 Thr Cys Thr Cys Tyr Arg
 35

 <210> 81
 <211> 38
 <212> PRT
 <213> Leiurus quinquestriatus

 <400> 81
 Gly Phe Gly Cys Pro Leu Asn Gln Gly Ala Cys His Arg His Cys Arg
 1 5 10 15
 Ser Ile Arg Arg Arg Gly Gly Tyr Cys Ala Gly Phe Phe Lys Gln Thr

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Cys Thr Cys Tyr Arg Asn		
35		
<210> 82		
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<213> Phyllomedusa sauvagii		
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Ala Leu Trp Lys Thr Met Leu Lys Lys Leu Gly Thr Met Ala Leu His		
1	5	10
Ala Gly Lys Ala Ala Leu Gly Ala Ala Asp Thr Ile Ser Gln Thr Gln		
20	25	30
<210> 83		
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<213> Drosophila melanogaster		
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Gly Lys Pro Arg Pro Tyr Ser Pro Arg Pro Thr Ser His Pro Arg Pro		
1	5	10
Ile Arg Val		15
<210> 84		
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<212> PRT		
<213> Rana esculenta		
<400> 84		
Gly Ile Phe Ser Lys Leu Gly Arg Lys Lys Ile Lys Asn Leu Leu Ile		
1	5	10
Ser Gly Leu Lys Asn Val Gly Lys Glu Val Gly Met Asp Val Val Arg		
20	25	30
Thr Gly Ile Asp Ile Ala Gly Cys Lys Ile Lys Gly Glu Cys		
35	40	45
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<212> PRT		
<213> Bos taurus		
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Ile Leu Pro Trp Lys Trp Pro Trp Trp Pro Trp Arg Arg		
1	5	10
<210> 86		
<211> 25		
<212> PRT		

<213> Bos taurus

<400> 86
 Phe Lys Cys Arg Arg Trp Gln Trp Arg Met Lys Lys Leu Gly Ala Pro
 1 5 10 15
 Ser Ile Thr Cys Val Arg Arg Ala Phe
 20 25

<210> 87

<211> 34

<212> PRT

<213> Lactococcus lactis

<400> 87
 Ile Thr Ser Ile Ser Leu Cys Thr Pro Gly Cys Lys Thr Gly Ala Leu
 1 5 10 15
 Met Gly Cys Asn Met Lys Thr Ala Thr Cys His Cys Ser Ile His Val
 20 25 30
 Ser Lys

<210> 88

<211> 34

<212> PRT

<213> Staphylococcus epidermidis

<400> 88
 Thr Ala Gly Pro Ala Ile Arg Ala Ser Val Lys Gln Cys Gln Lys Thr
 1 5 10 15
 Leu Lys Ala Thr Arg Leu Phe Thr Val Ser Cys Lys Gly Lys Asn Gly
 20 25 30
 Cys Lys

<210> 89

<211> 56

<212> PRT

<213> Bacillus subtilis

<400> 89
 Met Ser Lys Phe Asp Asp Phe Asp Leu Asp Val Val Lys Val Ser Lys
 1 5 10 15
 Gln Asp Ser Lys Ile Thr Pro Gln Trp Lys Ser Glu Ser Leu Cys Thr
 20 25 30
 Pro Gly Cys Val Thr Gly Ala Leu Gln Thr Cys Phe Leu Gln Thr Leu
 35 40 45
 Thr Cys Asn Cys Lys Ile Ser Lys
 50 55

<210> 90

<211> 37

<212> PRT

<213> Leuconostoc gelidum

<400> 90

Lys Tyr Tyr Gly Asn Gly Val His Cys Thr Lys Ser Gly Cys Ser Val
1 5 10 15
Asn Trp Gly Glu Ala Phe Ser Ala Gly Val His Arg Leu Ala Asn Gly
20 25 30
Gly Asn Gly Phe Trp
35

<210> 91

<211> 23

<212> PRT

<213> Xenopus laevis

<400> 91

Gly Ile Gly Lys Phe Leu His Ser Ala Gly Lys Phe Gly Lys Ala Phe
1 5 10 15
Val Gly Glu Ile Met Lys Ser
20

<210> 92

<211> 23

<212> PRT

<213> Xenopus laevis

<400> 92

Gly Ile Gly Lys Phe Leu His Ser Ala Lys Lys Phe Gly Lys Ala Phe
1 5 10 15
Val Gly Glu Ile Met Asn Ser
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<210> 93

<211> 21

<212> PRT

<213> Xenopus laevis

<400> 93

Gly Met Ala Ser Lys Ala Gly Ala Ile Ala Gly Lys Ile Ala Lys Val
1 5 10 15
Ala Leu Lys Ala Leu
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<210> 94

<211> 24

<212> PRT

<213> Xenopus laevis

<400> 94

Gly Val Leu Ser Asn Val Ile Gly Tyr Leu Lys Lys Leu Gly Thr Gly

1	5	10	15				
Ala	Leu	Asn	Ala	Val	Leu	Lys	Gln
20							
 <210> 95							
<211> 25							
<212> PRT							
<213> Xenopus laevis							
 <400> 95							
Gly	Trp	Ala	Ser	Lys	Ile	Gly	Gln
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Gly	Leu	Lys	Glu	Leu	Ile	Gln	Pro
					20		25
 <210> 96							
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<213> Vespula lewisii							
 <400> 96							
Ile	Asn	Leu	Lys	Ala	Leu	Ala	Ala
1					5		10
 <210> 97							
<211> 26							
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<213> Apis mellifera							
 <400> 97							
Gly	Ile	Gly	Ala	Val	Leu	Lys	Val
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Ile	Ser	Trp	Ile	Lys	Arg	Lys	Arg
					20		25
 <210> 98							
<211> 40							
<212> PRT							
<213> Phormia terronovae							
 <400> 98							
Ala	Thr	Cys	Asp	Leu	Leu	Ser	Gly
1					5		10
Ala	Ala	His	Cys	Leu	Leu	Arg	Gly
					20		25
Lys	Gly	Val	Cys	Val	Cys	Arg	Asn
					35		40
 <210> 99							
<211> 39							
<212> PRT							

<213> Phormia terronovae

<400> 99
 Ala Thr Cys Asp Leu Leu Ser Gly Thr Gly Ile Asn His Ser Ala Cys
 1 5 10 15
 Ala Ala His Cys Leu Leu Arg Gly Asn Arg Gly Gly Tyr Cys Asn Arg
 20 25 30
 Lys Gly Val Cys Val Arg Asn
 35

<210> 100
 <211> 18
 <212> PRT
 <213> Limulus polyphemus

<400> 100
 Arg Arg Trp Cys Phe Arg Val Cys Tyr Arg Gly Phe Cys Tyr Arg Lys
 1 5 10 15
 Cys Arg

<210> 101
 <211> 18
 <212> PRT
 <213> Limulus polyphemus

<400> 101
 Arg Arg Trp Cys Phe Arg Val Cys Tyr Lys Gly Phe Cys Tyr Arg Lys
 1 5 10 15
 Cys Arg

<210> 102
 <211> 18
 <212> PRT
 <213> Sus scrofa

<400> 102
 Arg Gly Gly Arg Leu Cys Tyr Cys Arg Arg Arg Phe Cys Val Cys Val
 1 5 10 15
 Gly Arg

<210> 103
 <211> 16
 <212> PRT
 <213> Sus scrofa

<400> 103
 Arg Gly Gly Arg Leu Cys Tyr Cys Arg Arg Arg Phe Cys Ile Cys Val
 1 5 10 15

<210> 104
 <211> 18
 <212> PRT
 <213> Sus scrofa

<400> 104
 Arg Gly Gly Gly Leu Cys Tyr Cys Arg Arg Arg Phe Cys Val Cys Val
 1 5 10 15
 Gly Arg

<210> 105
 <211> 51
 <212> PRT
 <213> Apis mellifera

<400> 105
 Val Thr Cys Asp Leu Leu Ser Phe Lys Gly Gln Val Asn Asp Ser Ala
 1 5 10 15
 Cys Ala Ala Asn Cys Leu Ser Leu Gly Lys Ala Gly Gly His Cys Glu
 20 25 30
 Lys Gly Val Cys Ile Cys Arg Lys Thr Ser Phe Lys Asp Leu Trp Asp
 35 40 45
 Lys Tyr Phe
 50

<210> 106
 <211> 39
 <212> PRT
 <213> Sacrophaga peregrina

<400> 106
 Gly Trp Leu Lys Lys Ile Gly Lys Lys Ile Glu Arg Val Gly Gln His
 1 5 10 15
 Thr Arg Asp Ala Thr Ile Gln Gly Leu Gly Ile Ala Gln Gln Ala Ala
 20 25 30
 Asn Val Ala Ala Thr Ala Arg
 35

<210> 107
 <211> 39
 <212> PRT
 <213> Sacrophaga peregrina

<400> 107
 Gly Trp Leu Lys Lys Ile Gly Lys Lys Ile Glu Arg Val Gly Gln His
 1 5 10 15
 Thr Arg Asp Ala Thr Ile Gln Val Ile Gly Val Ala Gln Gln Ala Ala
 20 25 30
 Asn Val Ala Ala Thr Ala Arg

35

<210> 108

<211> 47

<212> PRT

<213> Bos taurus

<400> 108

Ser Asp Glu Lys Ala Ser Pro Asp Lys His His Arg Phe Ser Leu Ser
 1 5 10 15
 Arg Tyr Ala Lys Leu Ala Asn Arg Leu Ala Asn Pro Lys Leu Leu Glu
 20 25 30
 Thr Phe Leu Ser Lys Trp Ile Gly Asp Arg Gly Asn Arg Ser Val
 35 40 45

<210> 109

<211> 17

<212> PRT

<213> Tachypyleus tridentatus

<400> 109

Lys Trp Cys Phe Arg Val Cys Tyr Arg Gly Ile Cys Tyr Arg Arg Cys
 1 5 10 15
 Arg

<210> 110

<211> 17

<212> PRT

<213> Tachypyleus tridentatus

<400> 110

Arg Trp Cys Phe Arg Val Cys Tyr Arg Gly Ile Cys Tyr Arg Lys Cys
 1 5 10 15
 Arg

<210> 111

<211> 46

<212> PRT

<213> Hordeum vulgare

<400> 111

Lys Ser Cys Cys Lys Asp Thr Leu Ala Arg Asn Cys Tyr Asn Thr Cys
 1 5 10 15
 Arg Phe Ala Gly Gly Ser Arg Pro Val Cys Ala Gly Ala Cys Arg Cys
 20 25 30
 Lys Ile Ile Ser Gly Pro Lys Cys Pro Ser Asp Tyr Pro Lys
 35 40 45

<210> 112

<211> 23
<212> PRT
<213> Trimeresurus wagleri

<400> 112

Gly	Gly	Lys	Pro	Asp	Leu	Arg	Pro	Cys	Ile	Ile	Pro	Pro	Cys	His	Tyr
1				5					10					15	
Ile	Pro	Arg	Pro	Lys	Pro	Arg									
				20											

<210> 113
<211> 63
<212> PRT
<213> Androctonus australis hector

<400> 113

Val	Lys	Asp	Gly	Tyr	Ile	Val	Asp	Asp	Val	Asn	Cys	Thr	Tyr	Phe	Cys
1					5				10				15		
Gly	Arg	Asn	Ala	Tyr	Cys	Asn	Glu	Glu	Cys	Thr	Lys	Leu	Lys	Gly	Glu
	20						25					30			
Ser	Gly	Tyr	Cys	Gln	Trp	Ala	Ser	Pro	Tyr	Gly	Asn	Ala	Cys	Tyr	Cys
	35						40				45				
Lys	Leu	Pro	Asp	His	Val	Arg	Thr	Lys	Gly	Pro	Gly	Arg	Cys	His	
	50						55			60					